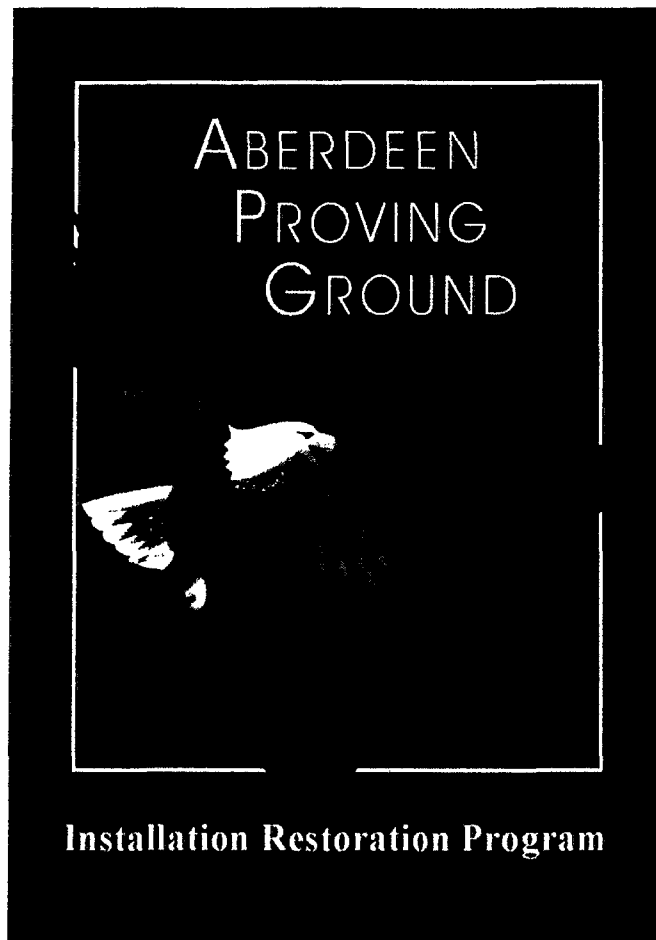


**EPA Superfund  
Record of Decision:**

**ABERDEEN PROVING GROUND (MICHAELSVILLE  
LANDFILL)  
EPA ID: MD3210021355  
OU 03  
ABERDEEN, MD  
07/17/2000**



**WESTERN BOUNDARY STUDY AREA  
OPERABLE UNIT 1 ABERDEEN AREA  
ABERDEEN PROVING GROUND, MARYLAND  
RECORD OF DECISION  
FINAL**

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July 2000

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# TABLE OF CONTENTS

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<b>Section ONE Declaration for the Record of Decision</b>	<b>1-1</b>
1.1 Site Name and Location	1-1
1.2 Statement of Basis and Purpose	1-1
1.3 Assessment of the Site	1-1
1.4 Description of the Selected Remedy	1-1
1.5 Statutory Determination	1-3
<b>Section TWO Decision Summary</b>	<b>2-1</b>
2.1 Site Name, Location, and Description	2-1
2.1.1 Site Name and Location	2-1
2.1.2 Topography	2-2
2.1.3 Adjacent Lands Use	2-2
2.1.4 Natural Resource Use	2-2
2.1.5 Distance to Nearby Population (Receptors)	2-2
2.1.6 Surface Water and Groundwater Resources	2-2
2.1.7 Surface and Subsurface Features	2-2
2.2 Site History and Enforcement Activities	2-3
2.3 Highlights of Community Participation	2-4
2.4 Scope and Role of Operable Unit (or Response Action) Within Site	
Strategy	2-5
2.5 Site Characteristics	2-5
2.6 Summary of Site Risks	2-6
2.6.1 Human Health Risk Assessment	2-7
2.6.2 Ecological Risks	2-8
2.7 Summary of the Remedial Alternatives for OU1	2-8
2.7.1 Alternative 1: No Action	2-8
2.7.2 Alternative 2: Limited Action	2-8
2.7.3 Alternative 3: Plant Construction With GAC Adsorption	2-9
2.7.4 Alternative 4: Air Stripping	2-9
2.7.5 Alternative 5: Extraction Well(s)	2-10
2.8 Summary of the Comparative Analysis of Alternatives	2-10
2.8.1 Overall Protection of Human Health and the Environment	2-10
2.8.2 Compliance with ARARs	2-11
2.8.3 Long-term Effectiveness and Permanence	2-11
2.8.4 Reduction of Toxicity, Mobility, or Volume of	
Contaminants through Treatment	2-11
2.8.5 Short-term Effectiveness	2-11
2.8.6 Implementability	2-12
2.8.7 Cost	2-12
2.8.8 State/Support Agency Acceptance	2-12
2.8.9 Community Acceptance	2-12
2.9 Selected Remedy	2-12
2.9.1 Major Components of the Remedial Alternative	2-12
2.9.2 Remediation Goal	2-13

# TABLE OF CONTENTS

---

2.9.3	Management of Residuals . . . . .	2-13
2.10	Statutory Authority Finding . . . . .	2-13
2.11	Explanation of Significant Changes . . . . .	2-14
2.12	Performance Monitoring and Standards . . . . .	2-14
<b>Section THREE</b>	<b>Responsiveness Summary . . . . .</b>	<b>3-1</b>
3.1	Overview . . . . .	3-1
3.2	Background on Community Involvement . . . . .	3-1
3.3	Summary of Comments Received During the Public Comment Period and Agency Responses . . . . .	3-2
3.4	Sample newspaper notice announcing the public comment period and the public meeting . . . . .	3-10
<b>Section FOUR</b>	<b>References . . . . .</b>	<b>4-1</b>
<b>List of Tables</b>		
Table 1:	Summary and Cumulative Risks Associated with Exposures to Western Boundary Study Area OU1 Groundwater under Future Land-Use Conditions	
Table 2:	Chemical-Specific ARARs	
Table 3:	Action-Specific ARARs	
<b>List of Figures</b>		
Figure 1:	Location of Aberdeen Proving Ground, Maryland	
Figure 2:	Location of the WBSA and Areas Within the WBSA at APG	
Figure 3:	Schematic of Harford County Production Wells and TCE Plume	
Figure 4:	Schematic of Relocated GAC Treatment Plant at the Harford County Perryman Facility	

# ACRONYMS

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AFTA	Aberdeen Area Fire Training Area
APG	Aberdeen Proving Ground
APGSCC	APG Superfund Citizens Coalition
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COMAR	Code of Maryland Regulations
COPC	Chemicals of Potential Concern
1,1-DCE	1,1-Dichloroethene
DSHE	Directorate of Safety Health and the Environment
FFS	Focused Feasibility Study
GAC	Granular Activated Carbon
gpm	Gallons per Minute
HCP	Harford County Production Wells
LUCAP	Land Use Control Action Plan
MCLs	Maximum Contaminant Levels
MD	Maryland
MDE	Maryland Department of the Environment
mgd	Million Gallons per Day
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priority List
OU	Operable Unit
PAA	Phillips Army Airfield
PAALF	Phillips Army Airfield Landfill
POL	Petroleum/Oil/Lubricant
RAO	Remedial Action Objectives
RBCs	EPA Region III Risk-based concentrations
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RFA	RCRA Facility Assessment
ROD	Record of Decision
SARA	Superfund Amendment Reauthorization Act
TCE	Trichloroethene
TRAAV	Test Range for Advanced Aerospace Vulnerability
ug/L	Micrograms per Liter
URSGWCFS	URS Greiner Woodward-Clyde Federal Services
USC	U. S. Code
USEPA	U.S. Environmental Protection Agency
USTs	Underground Storage Tanks
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WBSA	Western Boundary Study Area

**1.1 SITE NAME AND LOCATION**

This Record of Decision (ROD) is for Operable Unit 1 (OU1) of the Western Boundary Study Area (WBSA), also referred to herein as the "site". The WBSA is in the Aberdeen Area of Aberdeen Proving Ground (APG) in Harford County, Maryland (Figure 1). OU1 is groundwater located in the southwestern portion of the WBSA near the Harford County Production (HCP) wells (Figure 2). The WBSA is not on the U.S. Environmental Protection Agency's (USEPA's) National Priority List (NPL) but APG and the Department of the Army have agreed in a Federal Facility Agreement with the USEPA to follow the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process in remediating this site.

**1.2 STATEMENT OF BASIS AND PURPOSE**

This decision document presents the selected remedial action for OU1 of the WBSA of APG in Harford County, Maryland, which was chosen in accordance with CERCLA, as amended by the Superfund Amendment Reauthorization Act (SARA) and, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record file for this site. The State of Maryland concurs with the selected remedy.

**1.3 ASSESSMENT OF THE SITE**

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances from this site.

**1.4 DESCRIPTION OF THE SELECTED REMEDY**

This operable unit is the first of three operable units for the site. OU1 is the groundwater in the southwestern two-thirds of the WBSA near the Harford County well field. OU2 is the groundwater in the northeastern one-third of the WBSA near the City of Aberdeen well field. OU3 contains all other media in the WBSA, including soil, sediment, and surface water. This ROD addresses OU1 only.

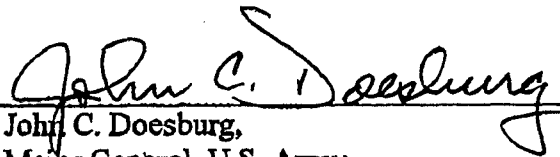
This action addresses the principal threat at the site by treating the most highly contaminated groundwater. Treatment residuals will be disposed of off-site, such that the site will require long-term management. Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted every five years after commencement of remedial action to insure that the selected remedy continues to provide adequate protection of human health and environment. The major components of the selected remedy, Plant Construction with Granular Activated Carbon (GAC) Adsorption, include:

- GAC treatment of contaminated water from HCP wells.
- A new GAC plant will be constructed at Harford County's Perryman facility. Components from the existing GAC plant will be utilized. The Army will enter into a long term contract or other appropriate agreement with Harford County which will detail the relationship between them for purposes of transferring funds to the County; designing the treatment plant; constructing the plant; operating the treatment plant; and groundwater monitoring.

- A long term contract or other appropriate agreement will be executed between the Army and Harford County to determine appropriate responsibilities for construction, operation, and maintenance of the facility. Note - the implementation of this ROD is contingent upon the Army and Hartford County finalizing the aforementioned long term contract or other appropriate agreement.
- Disposal or regeneration of GAC at offsite treatment or disposal facilities.
- Groundwater monitoring will be conducted and a review report will be prepared five years after commencement of remedial action to ensure that the selected remedy continues to provide adequate protection of human health.

**1.5 STATUTORY DETERMINATION**

It is the determination of APG and EPA that the selection of the "Plant Construction with GAC Adsorption" remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate requirements to the remedial action, and is cost-effective as set forth in Section 121 (d) of CERCLA, 42 U.S.C. Section 9621 (d) and Section 300.68 of the NCP. This remedy satisfies the statutory preferences as set forth in Section 121 of CERCLA, 42 U.S.C. Section 9621 (b), for remedies that employ treatment that reduce toxicity, mobility or volume as a principal element. It is finally determined that this remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.




John C. Doesburg,  
Major General, U.S. Army  
Commander, U.S. Army Aberdeen Proving Ground

12 Jul 00  
Date



**1.5 STATUTORY DETERMINATION**

It is the determination of APG and EPA that the selection of the "Plant Construction with GAC Adsorption" remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate requirements to the remedial action, and is cost-effective as set forth in Section 121 (d) of CERCLA, 42 U.S.C. Section 9621 (d) and Section 300.68 of the NCP. This remedy satisfies the statutory preferences as set forth in Section 121 of CERCLA, 42 U.S.C. Section 9621 (b), for remedies that employ treatment that reduces toxicity, mobility or volume as a principal element. It is finally determined that this remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.



Raymond J. Fatz,

Deputy Assistant Secretary of the Army for Environment  
Safety and Occupational Health

14 Jul 00

Date

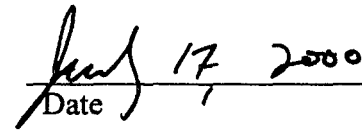
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Bradley M. Campbell  
Regional Administrator  
U. S. Environmental Protection Agency  
Region III



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Date

**2.1 SITE NAME, LOCATION, AND DESCRIPTION****2.1.1 Site Name and Location**

APG is located on the northwestern shore of the Chesapeake Bay, approximately 15 miles northeast of Baltimore, MD. The installation occupies nearly 72,000 acres in Baltimore and Harford Counties and is divided into two areas known as the Aberdeen Area and the Edgewood Area (Figure 1). The WBSA is located in the Aberdeen Area of APG in Harford County, Maryland.

The WBSA is located along the northwestern boundary of the Aberdeen Area of APG, bounded on the south and southeast by Old Baltimore and Michaelsville Roads (Figure 2). Parts of the WBSA have been used as an airfield, a testing area for weapons and vehicles, a maintenance facility and storage area for vehicles, a landfill, and a housing area for troops. Because limited weapons testing has been performed in the WBSA in the past and is presently continuing, unexploded ordnance (UXO) can be found in some portions of the study area.

Based on potential receptors, the WBSA was divided into three OUs. OU1 is the groundwater in the southwestern two-thirds of the WBSA near the Harford County well field. OU2 is the groundwater in the northeastern one-third of the WBSA near the City of Aberdeen well field. OU3 contains all other media in the WBSA, including soil, sediment, and surface water. This ROD only addresses OU1.

Other areas within the WBSA include the Phillips Army Airfield (PAA), Aberdeen Fire Training Area (AFTA), Phillips Army Airfield Landfill (PAALF), the Palmer House area, and the Test Range for Advanced Aerospace Vulnerability (TRAAV). These areas are briefly described below:

- ! The PAA is in the central portion of the WBSA and is an active airfield. Testing has been conducted in this area on various airplane parts, experimental aircraft, and sighting equipment.
- ! The AFTA, located north of the PAA, was used as a housing area for troops during World War II. Fire training exercises took place from the early 1960s until March 1989.
- ! The PAALF, located just north of the PAA was used as a sanitary landfill since 1950. The area has been limited to inert construction debris since 1971.
- ! The Palmer House Area, located southwest of the PAA, has been and is currently used as a maintenance facility for test vehicles.
- ! The TRAAV, also located southwest of the PAA, contains various aircraft and associated parts that are stockpiled on the ground. Assembly, disassembly, testing, and firing into aircraft have occurred at the TRAAV.

The HCP wells are located approximately 1.5 miles southwest of the AFTA (Figure 3). A portion of the western border of the WBSA runs along the installation boundary where four of the HCP wells (HCP-5, -6, -8, and -9) are located (HCP-7 was never constructed). These wells currently pump water from OU1 and offpost areas. Four other wells (HCP- 1, -2, -3, and -4) are located off the installation property west of the WBSA in Perryman, Maryland.

The present geologic interpretation of surficial sediments at the Aberdeen Area consists of three distinct river terraces that trend from the northeast toward the southwest, roughly parallel to the Chesapeake Bay. These sediments are from fluvial or swampy areas of deposition. The contamination is generally found at intermediate depths between +20 and -80 feet relative to mean sea level.

Historically, the groundwater flow direction in the WBSA has been to the south, southwest and southeast where the shallow aquifer discharges into surface water bodies. However, pumping of the HCP wells altered the historic direction to have a component of groundwater flow towards the Harford County Well Field from the AFTA.

### **2.1.2 Topography**

The elevation of the WBSA varies from approximately 70 to approximately 20 feet above sea level. The topography is relatively flat and gently slopes to the south and southeast.

### **2.1.3 Adjacent Lands Use**

Lands adjacent to the WBSA on all sides are generally undeveloped. Most of the area to the north and northwest is farmland. To the south and southeast are APG test ranges. There is some development on APG east of the WBSA.

### **2.1.4 Natural Resource Use**

The only current uses of natural resources in the vicinity are seasonal hunting programs operated by APG including deer and upland game (squirrels, rabbits, etc.) hunting in the fall and turkey hunting in the spring.

### **2.1.5 Distance to Nearby Population (Receptors)**

The nearest human receptors of groundwater from the WBSA are the offpost Harford County population drinking the water distributed to their homes. The closest homes to the study site are adjacent to APG along the northwest boundary.

### **2.1.6 Surface Water and Groundwater Resources**

Surface water is not used as a human resource in or near the WBSA until Romney Creek empties into the Chesapeake Bay approximately six to seven miles downstream (to the southwest). Surface water will be evaluated in the ROD for OU3.

Groundwater is a resource at the WBSA for the Harford County well field located near and along the installation boundary. In addition there are a small number of private residential wells (three identified by the County) near the WBSA.

### **2.1.7 Surface and Subsurface Features**

Surface features are grass, trees, and shrubs with occasional buildings and manmade wetlands or swamps. Subsurface features include Underground Storage Tanks (USTs) and underground utilities. Petroleum/Oil/Lubricant (POL) USTs at APG are regulated under the UST program.

**2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES**

The WBSA has been the object of environmental investigation since the late 1980s. The investigation began in September 1987 as part of a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) of the AFTA and Other Aberdeen Areas. In 1989 and 1990 the AFTA was investigated and TCE was detected in the groundwater beneath the AFTA. Though the AFTA was a part of the Other Aberdeen Areas under the 1990 Federal Facilities Agreement for APG, subsequently as the scope of the contamination issues was better understood, the WBSA was established which included the AFTA.

In February 1991, trichloroethene (TCE) was detected in HCP well HCP-6 (located on-post) of the Perryman well field which is located approximately 1.5 miles southwest of the AFTA. TCE was subsequently detected in well HCP-5. During the RFA, the AFTA was identified as a potential source for chemical contamination of several media and was thus targeted for a groundwater study as a potential source for the TCE. An initial groundwater investigation in 1992 indicated that the AFTA was a likely source of TCE in the Harford County wells.

A 1993 investigation utilizing the HydroPunch™ method of sampling groundwater defined the extent of Volatile Organic Compound (VOC)-contaminated groundwater between the AFTA and the HCP wells. The HydroPunch™ and subsequent investigations concluded that VOC contamination from the AFTA into the upper aquifer is affecting the HCP wells. Following an evaluation of contingency options for the well field, APG conducted a CERCLA time critical Removal Action to install a GAC treatment plant to treat the groundwater from wells HCP-5 and HCP-6 while the Remedial Investigation (RI) was conducted.

HCP wells HCP-5 and HCP-6 are currently treated by the existing GAC system. The system also has the capacity and available connections to treat wells HCP-8 and HCP-9 should these wells become contaminated. Water from HCP-4 cannot be treated by the existing system because it is not connected to the plant and it is located on the other side of the AMTRAK high speed rail lines.

A Focused Feasibility Study (FFS) for OU1 was initiated based on the RI results. An FFS identifies and evaluates potential remedial alternatives and concludes with a recommendation of the preferred remedial alternative(s). The selection was made based on the nine criteria specified in the National Contingency Plan, including protection of human health and the environment; compliance with all applicable or relevant and appropriate requirements (ARARs), long-term effectiveness; reduction of toxicity, mobility, and volume of chemicals through treatment; short-term effectiveness; implementability; and cost. The FFS selected a preferred alternative to insure that concentrations of contaminants entering the Harford County water distribution system do not exceed Maximum Contaminant Levels (MCLs) or other health-based criteria.

A Proposed Plan was initiated for OU1 based on the RI and FFS. The Proposed Plan presents the preferred alternative to the public. It provides a brief summary of all the alternatives studied, highlighting key factors that led to the identification of the preferred alternative.

A public meeting was held 29 June 1999 during which comments were received on the RI, FFS, Proposed Plan, the preferred remedial alternative, and other identified alternatives.

**2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION**

APG, EPA, and MDE provide information regarding the site investigation and cleanup of the WBSA to the public through the Administrative Record file, public meetings, and announcements published in local newspapers. The Draft Remedial Investigation Report for the WBSA, Final Focused Feasibility Study for Operable Unit 1, and Proposed Plan for Operable Unit 1 of the WBSA were available to the public 9 June 1999. These three documents were made available to the public in both the administrative record and information repositories set up at the following locations for public access:

- 1) Harford County Library  
Aberdeen Branch  
21 Franklin Street  
Aberdeen, Maryland 21001
- 2) Harford County Library  
Edgewood Branch  
2205 Hanson Road  
Edgewood, Maryland 21040
- 3) Aberdeen Proving Ground  
TECOM Public Affairs  
Building 314, Room 157  
(Aberdeen Area)

The notice of availability of these three documents was published in the Aegis, Cecil Wig, Kent County News, Avenue, and East County Times newspapers on 9 June 1999. The public can also obtain further information by contacting any one of the following representatives:

- 1) Mr. Kenneth P. Stachiw, Program Manager  
U.S. Army Aberdeen Proving Ground  
Directorate of Safety, Health and Environment  
ATTN: STEAP-SH-ER  
Aberdeen Proving Ground, MD 21010  
(410) 436-3320
- 2) Mr. Steve Hirsh, RPM (3HS13)  
U.S. Environmental Protection Agency  
Region III  
1650 Arch Street  
Philadelphia, PA 19103  
(215) 814-3352
- 3) Mr. John Fairbank  
Maryland Department of the Environment  
Waste Management Division  
2500 Broening Highway  
Baltimore, MD 21224  
(410) 631-3497

The public comment period was from 9 June 1999 to 23 July 1999. Public meetings have been held throughout the investigation phase of the WBSA and continue to be held. The Army, USEPA, and Maryland Department of the Environment (MDE) have solicited input from the community on the proposed alternative and have encouraged the public to gain a more comprehensive understanding of the site and activities that have occurred at the site. The public meeting to discuss the RI, FFS, and Proposed Plan was held on 29 June 1999 at the Aberdeen Senior Center in Aberdeen, Maryland. At these meetings, representatives from APG answered questions about problems at the site and potential remedial alternatives.

Comments on the Proposed Plan, either in writing or presented orally at the public meeting, are included along with responses in Section 3.3, Summary of Comments Received During the Public Comment Period and Agency Responses, of this ROD, under the Responsiveness Summary Section.

This decision document presents the selected remedial action for the WBSA, in Aberdeen, Maryland, chosen in accordance with CERCLA, as amended by SARA and the NCP. The decision for this site is based upon information contained in the administrative record.

## **2.4 SCOPE AND ROLE OF OPERABLE UNIT (OR RESPONSE ACTION) WITHIN SITE STRATEGY**

As with many sites, the problems at the WBSA are complex. As a result, APG organized the work into three operable units. These are

- OU1: The groundwater in the southwestern two-thirds of the WBSA near the Harford County well field
- OU2: The groundwater in the northeastern one-third of the WBSA near the City of Aberdeen well field
- OU3: All other media in the WBSA, including soil, sediment, and surface water.

APG and EPA are selecting a remedy for OU1. OU2 and OU3 are still being studied. This ROD addresses the planned activity for groundwater in the southwestern two-thirds of the WBSA near the Harford County well field.

The contaminated groundwater is a principal threat at this site because of the direct ingestion of drinking water from wells that contain contaminants above the MCLs. The Army has been providing treatment for HCP wells HCP-5 and HCP-6 since 1993. The purpose of this ROD is to prevent current or future exposure to the contaminated groundwater, to reduce contaminant migration, and to remediate the aquifer by reducing contaminant concentrations below MCLs for TCE (5 ppb) and health-based levels for RDX (2 ppb).

## **2.5 SITE CHARACTERISTICS**

The following are the specific site characteristics for the WBSA:

- ! The types of contaminants in OU1 contributing to the risks associated with exposure to groundwater were VOCs (1,1-dichloroethene and TCE) and metals (arsenic). Explosive compounds (RDX and TNT) have been found at low levels in monitoring wells. Arsenic was determined to be within background concentrations by the risk assessment.

- ! The suspected source of VOC contamination is the soil at the AFTA. This soil has been remediated; therefore, the primary source of contamination has been eliminated.
- ! The source of the explosives compounds has not been determined.
- ! The potential route of contaminant migration for OU1 is groundwater.
- ! The potential routes of exposure include ingestion, inhalation, and dermal contact.
- ! Site-specific factors that may affect the remedial actions at the site include a layer of less permeable material that divides the aquifer at depth into an upper and lower aquifer. This less permeable layer only occurs near the HCP wells. Some HCP wells are screened above the layer and some are screened below the layer.
- ! Types and characteristics of contaminants and affected media:
  - ! The estimated quantity or volume of hazardous substances or contaminated material present is unknown. However, the GAC system currently in place treats 1200 gallons per minute (gpm) or 1.7 million gallons per day (mgd) and has existing capacity to treat an additional 650 gpm or 0.9-mgd. Only water from HCP wells HCP-5 and HCP-6 is currently treated by the plant; HCP-8 and HCP-9 could be connected. Harford County plans on upgrading wellfield production to 5.2 mgd. If the groundwater were to be treated for the entire 30 years used to compare costs for the different alternatives, the total amount of water treated would equal approximately  $5.7 \times 10^{10}$  gallons.
  - ! The concentration of hazardous substances (contaminants) in WBSA OU1 groundwater historically ranged up to 223 ug/L of TCE. The highest concentration of TCE during the most recent round of groundwater sampling (March 1998) was 95 ug/L.
  - ! The TCE plume extends from the AFTA to HCP wells HCP-5 and HCP-6 (Figure 3). The vertical extent of contamination is from near the water table at the AFTA (approximately 30 feet above sea level) to approximately 60 feet below sea level near the HCP wells.
  - ! Groundwater modeling by APG and the Maryland Geological Survey indicates there is a potential for TCE to be detected in well HCP-4 at some point in the future. The source of the TCE is APG.
  - ! The potential surface and subsurface pathway of migration for OU1 is groundwater. Other potential pathways will be assessed under OU3.
- ! All known current risks and potential routes of human and environmental exposure include ingestion, dermal contact, and inhalation of groundwater.

## **2.6 SUMMARY OF SITE RISKS**

The Remedial Investigation (URSGWCFS, 1999) included a human health risk assessment that addressed the potential current and future risks posed to human health associated with this site. An ecological risk assessment was not evaluated as part of OU1 because ecological receptors are not exposed to groundwater. Ecological risk for this site will be evaluated under OU3 of the WBSA.

Following EPA requirements, the risk assessment included estimates of the risk posed to human health through both the current and future residential land-use scenarios. The current land-use



scenario estimates the level of risk posed to human health and the environment based on the Army's current use of the land. Under future land-use conditions, site worker and residential exposures were considered for evaluation. Future residential development of the WBSA was considered highly unlikely given the industrial designation of the site. However, because production wells that currently supply residences are located within OU1, risks associated with future child and adult residential exposures to groundwater were evaluated.

Health risks are defined based on a conservative estimate of the potential carcinogenic risk or potential to cause other health effects not related to cancer. Carcinogenic risks and noncarcinogenic risks were evaluated as part of this risk assessment. Cancer risks are expressed as a number reflecting the increased chance, beyond that which is normal in the human population, that a person will develop cancer if he/she is directly exposed to the contaminants found in the groundwater at a site for 30 years. For example, EPA's acceptable risk range for cancer is  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ , meaning that there is one additional chance in ten thousand ( $1 \times 10^{-4}$ ) to one additional chance in one million ( $1 \times 10^{-6}$ ) that a person will develop cancer if exposed to a hazardous waste site. The risks associated with developing other health effects are expressed as a hazard index. A hazard index of one or less indicates the human population is unlikely to experience adverse health effects.

### **2.6.1 Human Health Risk Assessment**

The baseline risk assessment estimated the current and future health effects of fifteen chemicals of potential concern (COPC). The groundwater data was divided into five groups based on hydrogeologic information, contaminant levels and groundwater usage: TCE Plume, the Explosives Area, PAA, TRAAV, and a Site Wide grouping. The data groupings did not include any HCP wells or effects of the existing GAC treatment plant. The maximum concentration of chemicals detected in each of the data groups were compared to EPA Region III Risk-based concentrations (RBCs). All organics with concentrations above the RBCs were selected as COPCs. Only those inorganics with maximum concentrations above both RBC's and reference levels were selected as COPC's.

Under future land-use conditions, a site worker's ingestion exposures to groundwater from three of the groundwater groupings (Site Wide, TCE Plume, and Explosives Area) were evaluated. Also under future residential land-use conditions, a child's ingestion and dermal absorption exposures to groundwater, as well as an adult's ingestion, dermal absorption, and inhalation exposures to groundwater were evaluated.

The cumulative cancer risks associated with both child and adult residents for all data groupings were within the EPA target risk range and the cumulative hazard indices for the future residential scenarios equaled or slightly exceeded 1 for each data grouping (Table 1). These calculations were made as if the current treatment facility was not in place. The compounds contributing to the risk calculations associated with exposure to groundwater were 1,1-dichloroethene, TCE and arsenic. While explosives were present, they were not predominant chemicals of concern because of their low levels. Because arsenic levels were consistent with natural background levels in the area and site-specific reference levels, the arsenic levels are not considered harmful. However, the cumulative lifetime hazard index value estimated for the combined noncarcinogenic effects of the COPCs equaled or exceeded 1 for each data grouping of the future

residential scenarios (Table 1). Thus there is the potential for adverse human health effects if future residents ingest or absorb untreated groundwater in the TCE plume area.

### 2.6.2 Ecological Risks

An ecological risk assessment was not evaluated as part of OU1 because ecological receptors are not exposed to OU1 groundwater. The contaminated portion of the plume is principally captured by the Perryman Well Field and treated. Small amounts of various chemicals in the uncaptured groundwater of WBSA OU1 do not pose human or ecological risk. Ecological risk for the WBSA will be evaluated under OU3.

## 2.7 SUMMARY OF THE REMEDIAL ALTERNATIVES FOR OU1

The Focused Feasibility Study lists and analyzes possible interim and final actions that were considered feasible. This section presents a description of the remedial alternatives that passed initial screening and follow the EPA guidance for presumptive remedies. Each of the options entails a CERCLA site review 5 years after the start of the remedial action. The two presumptive treatment remedies identified by EPA for halogenated VOCs are Air Stripping and Granular Activated Carbon Adsorption. The feasible alternatives for the TCE Plume in groundwater at the WBSA are:

- ! Alternative 1 -No Action
- ! Alternative 2 - Limited Action (continued operation of existing GAC adsorption treatment system)
- ! Alternative 3 - Plant Construction with GAC Adsorption
- ! Alternative 4 - Plant Construction with Air Stripping
- ! Alternative 5 - Extraction Well(s)

### 2.7.1 Alternative 1: No Action

Capital Cost	\$118,384
Annual O&M Cost	\$0
Present Net Worth (30 years)	\$118,384

CERCLA, as amended, and the National Contingency Plan require that the "no action" alternative be evaluated at every site to establish a baseline for comparison. Remedial action is not included as part of the "no action" scenario; however, dismantling of the current GAC system will be included as part of this alternative.

### 2.7.2 Alternative 2: Limited Action

Capital Cost:	\$6,000
Annual O&M Cost:	\$273,384
Present Net Worth (30 years)	\$2,614,050

Groundwater from two of the HCP production wells is being treated by the existing GAC system. This system involves groundwater being pumped through vessels containing activated

carbon to which the dissolved TCE contamination is adsorbed. Though TCE is the primary contaminant of concern, the GAC unit is capable of treating both halogenated VOCs and explosives. If after a period of treatment, concentrations of contaminants are detected in the effluent, the carbon can be removed and replaced by fresh carbon. The "old" carbon is commonly regenerated at an offsite facility. The limited action alternative involves operation of the current plant with no existing upgrades or modifications. Thus, the system will continue to treat the groundwater from the two production wells, HCP-5 and HCP-6 with the capacity to treat wells HCP-8 and HCP-9. The system does not have the connections or treatment capacity to treat groundwater pumped from the other four wells. Additionally, this alternative includes development of a groundwater monitoring plan and continued yearly monitoring of the Harford County Well Field to identify changes in the plume or groundwater flow.

### 2.7.3 Alternative 3: Plant Construction With GAC Adsorption

Capital Cost	\$1,675,621
Annual O&M Cost	\$270,928
Present Net Worth (30 years)	\$4,260,520

This alternative involves enlarging and relocating the existing treatment facility to Harford County's Perryman facility and connecting the system to all eight of the HCP wells (Figure 4). The plant would have a capacity of 5.2 mgd. The treatment system will continue to be a fixed bed GAC system. The GAC system will treat water from HCP-5 and HCP-6, which water is currently contaminated above remedial action levels. The other six wells which are not currently contaminated will also be connected to the treatment system. This alternative will be capable of handling any migration of groundwater contamination due to increased water usage by Hartford County in the future. In addition, the treatment of uncontaminated water will not shorten the life of the granular activated carbon or otherwise increase the annual O&M costs. As in Alternative 2, the GAC unit is a presumptive remedy, a proven solution, and is capable of handling explosives as well as the halogenated VOCs. Additionally, this alternative includes development of a groundwater monitoring plan and continued yearly monitoring of the Harford County Well Field to identify changes in the plume or groundwater flow.

### 2.7.4 Alternative 4: Air Stripping

Capital Cost	\$1,104,947
Annual O&M Cost	\$504,978
Present Net Worth (30 years)	\$5,896,216

Alternative 4 and Alternative 3 are essentially the same except the treatment system differs. With Alternative 4, groundwater would be extracted from the aquifer and treated using a tower air stripper. Air stripping is a presumptive remedy for the treatment of halogenated VOCs. The technique involves using a forced air blower through an aeration tank or a tower with stacked stripping trays that contain a flowing water stream. The upward airflow creates a "froth" inside the aeration tank or stripper tower. The air and water mix causes the volatile organic compounds to be driven from the water into the passing air. The air stream carries the VOCs out of the tower or tank where the air is treated (using a GAC device if necessary) before being released to the atmosphere. The designed system will require a new plant and will be capable of treating all eight HCP wells with a capacity of 5.2 mgd. The system can remove all of the VOCs of concern,

but is ineffective for explosives and inorganic contaminants. Additionally, this alternative includes development of a groundwater monitoring plan and continued yearly monitoring of the Harford County Well Field to identify changes in the plume or groundwater flow.

### **2.7.5 Alternative 5: Extraction Well(s)**

Capital Cost	\$2,970,776
Annual O&M Cost	\$344,419
Present Net Worth (30 years)	\$6,114,085

Installation of new well(s) between the existing wells HCP-5/-6 and HCP-8/-9 to act as a barrier to ensure the TCE plume does not migrate off-post. This option would increase the pumping capacity of wells HCP-5/-6 and the newly installed well(s) capacity to provide a total of 5.2 mgd to meet the future Harford County water requirements. The new well(s) would be connected to the existing treatment facility and the capacity of the existing treatment facility would be increased to 5.2 mgd. The Army will request the County to cease production from well HCP-4. Additionally, this alternative includes development of a groundwater monitoring plan and continued yearly monitoring of the Harford County Well Field to identify changes in the plume or groundwater flow. This Alternative will be a contingency to the selected Alternative 3, if the Army can not achieve an agreement with Harford County on the long term contract or other appropriate agreement. This alternative was not included in the FFS and Proposed Plan.

## **2.8 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES**

The preferred alternative for treatment of water pumped from OU1 is Alternative 3: Plant Construction with GAC Adsorption. This section compares the potential performance of each remedial alternative against the nine evaluation criteria listed in the National Contingency Plan and notes how each alternative compares to the other alternatives under consideration. The nine evaluation criteria are: (1) overall protection to human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume of contaminants through treatment; (5) short-term effectiveness; (6) implementability; (7) cost; (8) State/support agency acceptance; and (9) community acceptance. The first two are threshold criteria and must be met before an alternative is eligible for selection. Criteria 3 through 7 are Primary Balancing Criteria and are used to weigh major trade-offs among criteria. The last two are Modifying Criteria and can only be considered after public participation. These nine evaluation criteria are discussed below. The "Detailed Analysis of Alternatives" can be found in the Focused Feasibility Study.

### **2.8.1 Overall Protection of Human Health and the Environment**

All of the alternatives except the "no action" alternative would provide adequate protection of human health and the environment in the short term. The "no action" alternative will allow contaminants exceeding the MCLs to enter the Harford County distribution system. The Limited Action alternative does not address the longer-term needs of additional drinking water supplied by all eight HCP wells. Alternative 2 is protective of human health only for groundwater pumped by HCP-5, -6, -8 and -9 at current capacity. Alternative 2 does not have the capacity to treat 5.2 mgd. Any pollutants entering the additional four HCP wells, if pumped into the

distribution system, may be dermally absorbed, ingested, and inhaled by citizens. Alternative 3 - Plant Construction with GAC Adsorption is a proven technology and would provide protection by treating the groundwater to levels at or below MCLs and will also remove any explosives that may impact the well field in the future. Alternative 4 - Air Stripping will remove all of the VOCs of concern and is protective of human health for all the COPC's identified in the Risk Assessment. However, the air-stripping alternative will not sufficiently protect human health should explosives such as RDX reach the well field. Alternative 5 - Extraction Well(s) was not included in the FFS or the Proposed Plan. Alternative 5 was added to the ROD as a contingency since the ROD includes a long term contract or other appropriate agreement with Harford County.

Because the "no action" alternative is not protective of human health and the environment, it was eliminated from consideration under the remaining eight criteria. Although alternative 2 may not be fully protective of human health and the environment under future scenarios, it was still considered below.

### **2.8.2 Compliance with ARARs**

Chemical-specific and action-specific ARARs are presented in Tables 2 and 3.

Alternatives 3 and 4 would meet their respective ARARs from Federal and State laws. Alternative 2 - Limited Action may not be in compliance with federal and state MCLs if untreated contaminated groundwater from HCP-1, -2, -3 or -4 enters the distribution system. Otherwise, if only HCP-5, -6, -8 and -9 are used, all respective ARARs will be met.

### **2.8.3 Long-term Effectiveness and Permanence**

Alternative 2 has, in the past, exhibited a high degree of reliability and protectiveness. However, there may be significant residual risk remaining from untreated water in the aquifer if contamination were to reach wells HCP-1, -2, -3 and -4.

Alternatives 3 and 4 will prevent public exposure to water exceeding MCLs or reference doses over the long term. Both GAC and air stripping systems are very reliable, though air stripping does generally require more maintenance than other systems. The adequacy and long term dependability for GAC and air stripping have been well proven for the predominant chemicals of concern.

### **2.8.4 Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment**

Alternatives 2, 3 and 4 remove TCE and RDX from the extracted groundwater thereby reducing the toxicity. They also therefore, reduce the volume of TCE and RDX in the aquifer. Groundwater flow at this site is the principle control on the mobility of the predominant chemicals of concern.

### **2.8.5 Short-term Effectiveness**

Alternative 2 (Limited Action) is currently effective in treating water entering the distribution system, as long as HCP wells -1, -2, -3, and -4 have no VOCs detected in them. The potential does exist for TCE to reach HCP-4. If untreated groundwater from HCP-4 enters the system, this

alternative will not adequately protect human health and the environment. Upon construction, alternatives 3 and 4 will be effective in treating water entering the distribution system. Time required to meet the remedial objectives is short, and because of current safety and health practices there should be no substantial short-term risks to the community, environment, or workers due to construction. Minimal short-term risks to the community, environment, and workers are possible due to general construction work. Minimal time is required to meet the remedial objectives.

### **2.8.6 Implementability**

All of the groundwater technologies and remedies are readily available and generally proven. Alternative 2 is already in place, and its implementation requires very little additional capital and no construction. As four of the HCP wells cannot be treated under alternative 2, coordination and approval from regulatory agencies may be difficult. Alternative 3 is easily implemented.

The current GAC system already in place could readily be transported to the Harford County Perryman Plant and expansion of the system to accommodate the entire 5.2-mgd is relatively easy. Alternative 4 is not capital intensive, but operations and maintenance burdens can be fairly substantial. Implementation of this alternative does require significant construction to include a water reservoir and pumps to accommodate system pressure requirements.

### **2.8.7 Cost**

The overall comparative analysis of costs yields Alternative 2 as the least costly and Alternative 4 as the most costly. The Annual Operations and Maintenance Costs of Alternative 4 are nearly double that of Alternative 3.

### **2.8.8 State/Support Agency Acceptance**

The Maryland Department of the Environment concurs with the selection of Alternative 3 as a remedial action for OU1 groundwater.

### **2.8.9 Community Acceptance**

The community has accepted Alternative 3 during the public comment period because it provides reduction of toxicity, mobility, and volume of contaminated media in OU1 groundwater.

## **2.9 SELECTED REMEDY**

The selected remedy is a fixed bed GAC system at the Harford County Perryman facility, with a capacity of 5.2-mgd treating all eight HCP wells. The selected remedy will treat wells HCP-5 and HCP-6 that are currently contaminated and will serve as an appropriate control for those wells that have the potential to become contaminated.

### **2.9.1 Major Components of the Remedial Alternative**

The existing fixed bed GAC system at the Perryman Well Field treats 1.7 mgd and is connected to wells HCP-5 and HCP-6. Implementation of this alternative would require the relocation of

the system to the Perryman facility, connecting the system to all eight HCP wells, and upgrading the system to treat 5.2 mgd. The treatment system will continue to be a fixed bed GAC system. This system involves groundwater being pumped through vessels containing activated carbon to which the dissolved TCE contamination is adsorbed. The treatment of uncontaminated water will not shorten the life of the GAC or otherwise increase the annual O&M costs. Though TCE is the primary contaminant of concern, the GAC unit is capable of treating both halogenated VOCs and explosives, if necessary. The GAC unit is a presumptive remedy, a proven solution, and is capable of handling explosives as well as the halogenated VOCs. Additionally, this alternative includes development of a groundwater monitoring plan and continued yearly monitoring of the Harford County Well Field and monitoring wells to identify changes in the plume or groundwater flow. The implementation of this action is predicated on the County and Army agreeing to a long term contract or other appropriate agreement. If this long term contract or other appropriate agreement is not finalized, then an alternative course of action will be pursued.

### **2.9.2 Remediation Goal**

The remediation goal is to reduce the level of VOC contamination in water supplied to the Harford County distribution system to below MCLs. The corresponding risk levels to be attained at the conclusion of the response action are the MCLs, non-zero MCL goals and other risk based requirements. The point of compliance for the media being addressed is the effluent from the GAC treatment plant. The lead agency's basis for the remediation goal are the ARARs and risk calculations. The treatment system will be operated until such time that all wells connected to the treatment system test non-detect for three consecutive events over a period not less than six months. The institutional controls (i.e., keeping the treatment system in standby) and monitoring will continue until such time that the MCLs for TCE (5 ppb) and health-based levels for RDX (2 ppb) in the groundwater are met for this OU.

### **2.9.3 Management of Residuals**

When the concentration of contaminants in the effluent from the bed exceeds a certain level, the spent carbon will be removed by the supplier and the supplier will be responsible for disposal or regeneration.

## **2.10 STATUTORY AUTHORITY FINDING**

It is the recommendation of the lead agency, APG, that the existing fixed bed GAC system be expanded and moved to the Perryman facility. The plant will be operated by Harford County based on a long term contract or other appropriate agreement between the Army and Harford County. The GAC system is recommended based on the following rationale:

- ! It is necessary to protect human health and the environment.
- ! This system will provide adequate protection of human health and the environment through treatment of the contaminated ground water.
- ! The existing VOC risk and potential future explosive risk would be eliminated or reduced by this response action.

- ! The system will provide the public protection from possible future exposure to unhealthy levels of contamination for the production wells as a result of any increased groundwater usage by Hartford County.
- ! This remedy will not pose unacceptable short-term risk or cross-media impacts.
- ! The alternative is cost-effective; it is the least expensive of the alternatives that would meet the nine evaluation criteria.
- ! This remedy will comply with all Federal and State ARARs.
- ! Permanent solutions and alternative treatment (or resource recovery) technologies are utilized to the maximum extent practicable.
- ! Preference for treatment as a principal element is satisfied.

The USEPA reviews APG's plans for cleanup actions and the MDE also participates with the planning and selection of remedial actions.

## **2.11 EXPLANATION OF SIGNIFICANT CHANGES**

There have been no significant changes in the planned remedy and no future significant change in the remedy is anticipated.

## **2.12 PERFORMANCE MONITORING AND STANDARDS**

For the WBSA, groundwater will be extracted at a rate sufficient to reduce the toxicity, mobility, and volume of the contaminated media. The volume of water to be treated will be as much as 5.2 mgd based on the seasonal fluctuations and water use. The treatment technology identified is carbon adsorption for VOC removal. Treated water will meet MCLs and non-zero MCLGs, or other existing health-based criteria for contaminants of concern without MCLs or MCLGs. For this action, the health-based criteria for the explosive RDX will be 2 ppb.

A monitoring plan for the WBSA will be developed and implemented, and will include the sampling and analysis of groundwater. The monitoring program will also include effluent sampling and analysis. The specifics of the monitoring program (i.e., media sampled, target analytes, number of samples, frequency, and deliverables) will be determined during the work plan development phase and will be approved by EPA.

Five-year reviews will be conducted to evaluate continuing protectiveness of human health and the environment. The 5-year review will culminate in the preparation of a report. Specifically, the effectiveness of the selected remedy will be reviewed, and it will be determined whether an adverse change in risk has occurred at the site.



The final component of the ROD is the Responsiveness Summary. The purpose of the Responsiveness Summary is to provide a summary of the public's comments, concerns, and questions about the WBSA OU1 groundwater and the Army's responses to these concerns.

During the public comment period, written comments were received by APG and by MDE.

APG held a public meeting on June 29, 1999 to formally present the Proposed Plan and to answer questions as well as receive comments. The transcript of this meeting is part of the administrative record for the site. All comments and concerns summarized below have been considered by the Army and EPA in selecting the interim cleanup methods for the WBSA.

This responsiveness summary is divided into the following sections:

- 3.1 Overview
- 3.2 Background on community involvement
- 3.3 Summary of comments received during the public comment period and APG's responses
- 3.4 Sample newspaper notice announcing the public comment period and the public meeting

### **3.1 OVERVIEW**

At the time of the public comment period, the Army had endorsed a preferred alternative for the WBSA OU1 Groundwater. APG proposed to relocate and expand the existing groundwater treatment facility. The existing facility treats water from two of the eight Harford County wells. The upgraded plant would use granular activated carbon to treat groundwater, and also would connect all eight of the HCP wells. APG would continue to monitor the plant's effectiveness and the groundwater. EPA concurred with the preferred alternative. MDE generally supported the Army's preferred alternative but stated it would finalize its position after reviewing public comments. MDE has concurred on the selected alternative. The community also seems to agree with the selected alternative.

### **3.2 BACKGROUND ON COMMUNITY INVOLVEMENT**

The WBSA has been of interest to citizens because of the proximity of Harford County and City of Aberdeen production wells. Interested stakeholders have included citizens in the Perryman area, APG's Restoration Advisory Board, and the APG Superfund Citizens Coalition (APGSCC).

A specific concern raised prior to the final Proposed Plan by APGSCC was whether the proposed action was a final or interim action. APGSCC commented that further work has to be done to identify the source(s) of the groundwater contamination. APGSCC agreed, however, that APG should move ahead with the construction of a new water treatment plant at this time in order to ensure the safety of the Harford County drinking water, but this should be considered an interim action, not a final action.

APG has maintained an active public involvement and information program. Highlights of the community's involvement in the site and APG's activities during the last two years follow:

- ! APG has kept the Restoration Advisory Board informed of the WBSA through updates at monthly meetings and provided RAB members with a copy of the draft Proposed Plan.
- ! APG released the Proposed Plan for the WBSA Groundwater for public comment on June 9, 1999. Copies were available to the public at APG's information repositories at the Aberdeen and Edgewood Branches of Harford County Library, and Miller Library at Washington College. A copy of the Proposed Plan also was posted on the Installation Restoration Program's Web Site, and the public was invited to comment through the Web Site.
- ! APG prepared a release for the APG News announcing the availability of the Proposed Plan, the dates of the public comment period, and the date and time of the public meeting.
- ! A 45-day public comment period on the Proposed Plan ran from June 9 to July 23, 1999.
- ! APG placed newspaper advertisements announcing the public comment period and meeting in The Aegis, the Cecil Whig, The Avenue, the Essex Times, and the Kent County News.
- ! APG prepared and published a fact sheet on the Proposed Plan. APG mailed copies of this fact sheet to more than 2,650 citizens and elected officials on its Installation Restoration Program mailing list. The fact sheet included a form which citizens could use to send APG their comments.
- ! On June 29, APG held a public meeting at the Aberdeen Senior Center. Representatives of the Army, EPA, and the MDE presented information on the site and their respective positions on the proposed cleanup alternatives.

### **3.3 SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES**

Comments raised during the public comment period on the WBSA Groundwater Proposed Plan are summarized below. The comments are categorized by source.

#### **COMMENTS FROM QUESTIONNAIRE INCLUDED WITH FACT SHEET**

As part of its fact sheet on the Proposed Plan, APG included a questionnaire that residents could return with their comments. APG received 9 completed returns. The alternatives preferred by individuals returning comment forms were:

- 0 Alternative No. 1 - Take No Action
- 0 Alternative No. 2 – Take Limited Action
- 8 Alternative No. 3 – Relocate and Upgrade Existing Treatment Plant
- 1 Alternative No. 4 – Construct a New Plant with a Tower Air Stripper
- 0 Have no preference

Written comments included on the form are summarized below.

**Comment No. 1:** [Commenter preferred alternative 3] “I am in favor for which ever is the safest and less hazardous for the community and the environment.”

**Response No. 1:** AP G agrees that protection of public health and the environment is a very high priority. Alternative No. 3 will provide such protection.

**Comment No. 2:** [Commenter preferred alternative 3] “I think it’s the best and safest alternative.”

**Response No. 2:** APG appreciates and acknowledges the feedback.

**Comment No. 3:** [Commenter preferred alternative 3] “Monitor number three alternative for explosive compounds.”

**Response No. 3:** Long-term monitoring is part of the selected alternative and will include sampling and analysis for explosive compounds.

**Comment No. 4:** [Commenter preferred alternative 4 as his preferred alternative.] “Include chemical and heavy metal capabilities. If the money is to be spent, expand the capabilities so future spending will not be necessary. Also, maintain good maintenance and quality of water will be safe for generations.”

**Response No. 4:** The risk assessment analyzed the level of metals at the site and found them to be at background/naturally-occurring levels or below levels determined by EPA to present a risk. Therefore, the treatment plant does not need to have the capability to treat the groundwater for heavy metals. APG agrees the expenditure of taxpayer resources should be carefully scrutinized; cost is one of the nine criteria used to evaluate various alternatives. APG believes Alternative 3 will provide sufficient capabilities to address any foreseeable future issues and is a cost-effective solution. An operations and maintenance plan will be developed to ensure proper maintenance of the plant.

**Comment No. 5:** [Commenter preferred alternative 3] “Why is the time frame for monitoring set at 30 years? Is this the time it would take to remove all of the TCE from the groundwater? What if the TCE levels fall below detectable levels?”

**Response No. 5:** It can take many years to remove TCE from the groundwater. A time frame of 30 years is a standard length of time used to determine project costs. APG, EPA and MDE will be evaluating the sampling results, including levels of TCE, and together will determine any appropriate changes to monitoring or treatment.

### **COMMENTS AT THE JUNE 29, 1999 PUBLIC MEETING**

A full transcript of the public meeting is at APG’s information repositories. Following is a summary of verbal comments made at the meeting.

**Comment No. 6:** A citizen inquired as to how long the Fire Training Area of the WBSA was in use.

**Response No. 6:** APG estimates that the Fire Training Area was in use for 20 years spanning from the mid-1960s to the mid-1980s.

**Comment No. 7:** A citizen asked if the current study would be extended past the WBSA boundaries indicated on the map of the area.

**Response No. 7:** APG has no current plans to extend the boundary.

**Comment No. 8:** A citizen asked what other off-post areas were being monitored.

**Response No. 8:** APG is currently only studying the area within close vicinity of the plume of contamination.

**Comment No. 9:** A citizen asked how often the monitoring of the water would be done and if it would only be done for the proposed period of 30 years.

**Response No. 9:** See response to comments 5 and 14.

**Comment No. 10:** A citizen asked if there had been any impact on Bush River and its surrounding tributaries from the WBSA.

**Response No. 10:** APG's studies show the contaminated groundwater in the WBSA is not flowing in the direction of the Bush River and therefore would not impact the River.

**COMMENTS FROM MR. THEODORE HENRY, COMMUNITY RAB MEMBER**

**Comment No. 11:** The Proposed Plan contained too many acronyms.

**Response No. 11:** APG will reduce the number of acronyms used in future proposed plans or spell them out.

**Comment No. 12:** "It is important to make the graphics support the discussion within the proposed plan. Figure 3 depicts the groundwater plume, which is located on page 3. The problem lies in the fact that the plume and the wells are discussed on pages 6, 7 and 8. As a RAB member, I request that the map be made easier to reference either by including future site specific maps as a box on each relevant page or as a foldout so the reader can reference it regardless of what page the related text is found. This same approach should be taken for acronyms. It is important to make sure that the map is adequately marked for the discussion. For instance, while a majority of the plume discussion revolves around AFTA, this area is not marked on the map. Additionally, it would have been very helpful to have a groundwater contour map to depict what was being said in the text. As we have discussed many times with regard to RAB presentations, there are many ways to make complicated material easier to understand. As a community RAB member, I request that the IRP and its contractors focus on this issue for the next proposed plan."

**Response No. 12:** APG will focus on improving graphics and readability in the next proposed plan.

**Comment No. 13:** "The text of the proposed plan does not clearly delineate the current production (gallons per day) of the Perryman Well Field, the expected daily production with the expansion of wells 5 & 6 and the maximum production possibility in twenty years based on population growth and additional well expansions. Given the growing population, it would make sense for APG to construct a system that can handle such expansion. Has APG and Harford County considered this issue?"

**Response No. 13:** APG and Harford County have discussed this issue. Harford County's permit for the Perryman well field allows a daily average of 4,250,000 gallons per day on a yearly basis and a daily average of 5,250,000 gallons per day for the month of maximum use. In the future, the County anticipates upgrading wells 5 and 6 to obtain 600 gallons per minute in additional capacity. The treatment plant will be designed to treat the levels of production envisioned by the County in its water and sewer master plan. The plant also will be designed to have a contingency capacity to handle additional small increases in production levels.

**Comment No. 14:** "While the ability for the proposed system to treat explosives is mentioned in the discussion of the alternatives, this contaminant is missing from other parts of the text where its presence is very relevant. For instance, page 8 mentions the possibility of 'TCE moving deeper and closer to HCP-4' based on the data from well 19-C. As I recollect, the explosive RDX was found consistently in this well at concentrations at or just below its RBC. As this

compound is a carcinogen, is it not important to consider the future destination of this compound in the ROD?"

In fact, the proposed plan does not mention that the source of the explosives has not been determined (and probably never will) and that there is no long-term data to evaluate whether explosives in the groundwater will increase or decrease in the years to come. Additionally, there is no way of knowing if or when the detected explosives will move off-post. However, the information presented regarding the potential movement of TCE toward HCP-4 suggests the same possible fate for the explosives that have been detected. Has APG considered the potential increase in explosives concentration in the selection of the remedial alternatives?"

**Response No. 14:** From September 1997 to June 1998, APG conducted four rounds of groundwater sampling in the vicinity of the Harford County wells; the samples were analyzed for explosive compounds. Explosive compounds, primarily RDX, were detected in isolated locations and appear to be the result of historic range activities within several areas of the WBSA and not from a single large source of explosives. EPA has classified RDX as a possible human carcinogen. (In one study, mice exposed to RDX developed tumors. Carcinogenic effects were not noted in rat studies and no human data are available.) As discussed in the Proposed Plan, page 9, Human Health Risk Assessment section, while explosive compounds were present, they were not identified as predominant chemicals of concern because of their low levels. Chlorinated solvents were detected at levels that could present a risk. Thus, following the process established by law, remedial alternatives were evaluated for the compounds that could present a risk to human health and the environment. However, the selected alternative is capable of treating groundwater containing explosive compounds and thus will ensure they do not enter drinking water. Also, a monitoring plan will be developed as a joint effort among the Army, the County, regulators and interested members of the public to ensure all concerns are addressed. APG will meet with interested community members within 90 days of signing the ROD to develop a monitoring plan.

In future proposed plans where APG is aware of specific citizen concerns that are relevant to the subject study area, APG will expand its discussion of those issues even if they do not present a risk and thus would not drive the remedial action. APG also will expand its discussion of treatment alternatives, such as treatment of other chemical compounds relevant to the study area which were not identified in the risk assessment as a threat to human health but which may be a concern of the public.

**Comment No. 15:** "The ROD that evolves from the proposed plan is the legal document by which APG implements the selected remedial alternative. It is a concern that the remedial action objectives listed in the proposed plan are for TCE and DCE, while not including any objectives pertaining to RDX. Without such objectives, it would seem that APG could implement a ROD that does not include any long-term monitoring for explosives. As a community RAB member, I request that the ROD include the appropriate language to avoid any long-term oversight or disregard for the explosives found in the groundwater both within the current operable unit and in adjacent study areas. Without such language in the ROD, would it be possible that the TCE and DCE would be found sufficiently treated and the plant dismantled or handed over to the Harford County, without any legal responsibility of APG to continue to treat or monitor for the explosives in this operable unit?"

To expedite the discussion of this issue, I should note that I understand that the ROD is subject to five-year reviews and that this would be one mechanism to determine if any selected remedy is meeting the objectives. First, it is not clear that explosives would be measured for in the five-year review based on the obscure language within the proposed plan regarding risks from explosives. Second, it is not clear that the explosives are an enforceable objective within the current language of the plan. Third, it is my understanding that the EPA is far behind in conducting five-year reviews and APG cannot leave such openings for impacts to local residents. As a community RAB member, I request that the ROD generated from this plan contains the necessary language to address these concerns and that the draft ROD is provided to the RAB for discussion and comment.”

**Response No. 15:** As mentioned in Response No. 14 above, APG will work with interested community members on the monitoring plan to ensure their concerns are addressed. Monitoring plans are developed after a ROD is signed. APG will provide a draft of the ROD to Restoration Advisory Board members for their review. EPA is in the process of developing a strategy for five-year reviews and this strategy also will be provided to Restoration Advisory Board members.

**Comment No. 16:** “It would seem appropriate that APG include this site within the Installation’s Land Use Control Action Plan (LUCAP) to protect future APG operations from inappropriately using this groundwater for activities on-post. For instance, what mechanisms are in place to keep an APG tenant from drilling a well in the area for non-potable use? Specifically, what would stop future well installation after the plant has been deemed no longer necessary and dismantled? It would seem the LUCAP could fulfill this need.”

**Response No. 16:** APG has controls in place to restrict drilling, excavation, unauthorized extraction from groundwater monitoring wells, and unauthorized installation of additional groundwater monitoring wells. Excavations, digging, or any type of intrusive work at APG requires a permit approved by APG’s Directorate of Public Works and Directorate of Safety, Health and Environment. Contamination information for the WBSA will be placed in APG’s Geographical Information System. The Geographical Information System is used in developing APG’s Master Plan and is accessed when a request is received for a digging permit and during other environmental processes.

**Comment No. 17:** “Page 15 explains that the U.S. Army would pay for capital costs of construction but work with Harford County to determine responsibilities for payment of operations and maintenance costs. This is critical information that should not be left out of the proposed plan. I cannot support this selected remedy until it is clear to what degree the Army will live up to its responsibility to treat the contamination it is responsible for.

Many employees of Harford County work too hard to adequately follow APG contamination issues and understand the uncertainties associated with contamination characterization and the long-term fiscal impacts of such unknowns. Inadequate and untested processes for long-term follow-up increases the potential burden of Harford County and its residents. It would seem appropriate for the Army to pay for the operation of this plant, given my understanding that this plant would not be necessary if it weren’t for APG contamination. What part of the fiscal responsibilities may fall to Harford County and subsequently the residents of Harford County and the State of Maryland?”

**Response No. 17:** APG has and will continue to take responsibility for contamination for which it is responsible. The Army and Harford County will be entering into a long term contract or other appropriate agreement that will address long-term fiscal responsibilities. Such agreements have historically taken a number of months to prepare. APG's preference is to move forward with the treatment plant to ensure human health is protected while the agreement negotiations take place. [Mr. Henry subsequently asked for the phone numbers of the two offices that would be negotiating the agreement. APG's Legal Office (410-278-4285) and Harford County's Law Department (410-638-3205) will be the two offices negotiating the agreement.]

### **COMMENTS FROM PERRYMAN RESIDENT**

**Comment No. 18:** "I agree with the selection of Alternative #3 to Relocate and Upgrade Existing Treatment Plant as the best of the Alternatives presented. I do not agree that it is adequate as presented in the literature from APG." "Alternative #4 points out the air stripper would not be effective in removing other organic chemicals such as explosives and metals. Federal Register vol. 63, No. 151 dated August 6, 1998, page 42032 titled "Announcement of Small System Compliance Technology Lists for Existing National Primary Drinking Water Regulations and Findings Concerning Variance Technologies" (based on large systems for feasibility) shows the only Inorganic recommended for Granular Activated Carbon Technology is Mercury, not Cadmium or other metals (Table 6). Therefore, Alternative #3 is not complete either."

**Response No. 18:** APG agrees that neither Alternative 3 nor Alternative 4 would be the best alternative if metals needed to be removed from the groundwater. Metals were detected during the remedial investigation sampling. The data was analyzed as part of the human health risk assessment, which determined the levels present were either at background/naturally-occurring levels or at levels that did not pose a human health risk. Therefore, APG is not planning to treat the groundwater to remove metals.

**Comment No. 19:** "I have not seen nor heard nothing from Harford County on this issue and I pay my water bill (and my sewage bill based on my water usage) to the County. Will the proposed system allow any future expansions planned by the County? My water pressure has been erratic for the past several years. Is this due to an increasing residential, industrial, and business demand; the current diversion of two wells for treatment by APG (there is additional hold up time required by Granular Activated Carbon Treatment); or equipment and capacity problems with the Plant?"

**Response No. 19:** APG and the County have discussed the future higher pumping rates envisioned by the County. The proposed system will accommodate these increased pumping rates and also have a contingency capacity.

A variety of factors can cause water pressure changes. You should contact the Harford County Department of Public Works, Water and Sewer Division, about any problems you have with your water supply or pressure.

**Comment No. 20:** "The APG Fact Sheet states: 'Historically the groundwater flow direction in this area has been towards the south. However, pumping of the HCP wells altered the direction so a portion of the groundwater from the Fire Training Area flows towards the County well field.' If this is so, what has been the effect of additional drawdown from industrial groundwater wells such as Clorox? What will be the effect of additional industrial and business expansion if they require their own wells? I see less and less farmland in the Perryman area, as the land is replaced by

concrete and blacktop. Is the County well field going to pull more and more water from the Fire Training Area of APG?”

**Response No. 21:** According to information from MDE, the production rates of the Harford County wells are much greater than the Clorox well. In 1998, the County wells withdrew 60 times more water than the Clorox plant. APG has increased the frequency of water level measurements and will continue to monitor these levels. The County does anticipate increasing production from wells 4, 5 and 6 and thus will pull more water from the area affected by solvents. However, the treatment plant will be able to handle the additional production.

**Comment No. 22:** “I also wish to know if APG will continue to track the contamination levels in the individual monitoring and production wells only for the next 30 years; or will the temptation to test only the diluted input and output of the Granular Activated Carbon Treatment be the rule? Who has responsibility after 30 years? If there are additional contaminants discovered, newly regulated chemicals, MCL’s are lowered, or new technologies are required, is APG responsible for further upgrades or am I looking at more taxes and fees from the County? Should I consider my own point-of-use system?”

**Response No. 22:** The Army is responsible for continuing to monitor the groundwater for as long as the solvent and explosive compounds are an issue and for remediating any additional contamination for which the proving ground is the source. The 36-year figure is not a maximum or a mandated timeframe; it is used only for the purpose of budgeting potential costs. For questions about taxes, fees, and private wells, you should contact the Harford County Department of Public Works, Water and Sewer Division.

**Comment No. 23:** “Would it be technologically possible to continue the current treatment (with the addition of well number 4 if required) with the installation of an underground dam to stop the flow from APG and to install its own cleanup and re-injection system on their side of the dam?”

**Response No. 23:** While it might be technologically possible to implement such a system, it may not be in the public’s best interests. Wells 4, 5 and 6 are the highest producing wells at the Perryman well field and thus are critical wells to the HCP system. Hydrologic isolation of the Perryman wells from APG would reduce the volume of water at the Perryman wells, which would adversely affect the supply of water to the Harford County system. For this reason, the concept of subsurface barriers or dams does not appear to be feasible.

#### **COMMENTS FROM MR. ARLEN CRABB, COMMUNITY RAB MEMBER**

**Comment No. 24:** “As a private homeowner, I rely on a private water well on my property for daily water use. I know that I am 2.2 miles northwest of HCP Well 5 and currently not in danger of the TCE plume. My concern is with the residents along Perryman Road southwest of the existing Treatment GAC Plant. We know the water flows toward Bush Creek, a southwest direction. Where is the plan to monitor the movement of the plume and what will happen when contaminants reach these wells? Is the plan to cap the well and connect the homeowner to the county water system at no cost to the homeowner? Where are the monitoring wells outside the boundary of APG? Considering the map marked Figure 2, shows the Western Boundary area reaching to Bush River area? Is the Army monitoring the off-post area?”

**Response No. 24:** APG has monitored the off-post area (details are in the RI report by URS Greiner Woodward Clyde Federal Services - see reference list), and as mentioned above, will be working with regulators and community members on the long-term monitoring plan. APG will



determine the location of permitted private wells near the WBSA from County records. It is APG's plan to prevent contamination from reaching off-post wells; however, if APG were the source of off-post contamination, APG would be responsible. Current monitoring indicates that groundwater contamination (solvents and explosive compounds) is captured by the Harford County wells. Groundwater modeling indicates that this will continue under current conditions if the Harford County wells are pumped at current or higher rates. If this situation changes, APG's Restoration Advisory Board, Harford County, EPA and MDE will be consulted to develop an appropriate action plan.

Note: APG met with Mr. Crabb and reviewed the off-post monitoring well locations with him.

**Comment No. 25:** "Alternative 2 is currently being used to treat HCP Wells 5 and 6, but what of future needs? I feel that Alternative 3 will provide more productive results in the interests of the community at large.

**Response No. 25:** APG agrees that Alternative 3 will be protective of human health and provide sufficient protection to the community in light of the County's master plan.

### **COMMENTS FROM MS. CHRISTINE GROCHOWSKI, COMMUNITY RAB CO-CHAIRPERSON**

**Comment No. 26:** It is important that there be no disruption in the current system now being used. You state that the existing treatment facility will be relocated and enlarged in order to treat water from all Harford County wells.

**Response No. 26:** APG will work with the County to assure service is uninterrupted. Other sources of water are available if the Harford County system has to be shut down temporarily for connections of the new treatment plant. There has been no change to the ROD.

**Comment No. 27:** I also feel that APG should be the owner operator of any system. Since the contamination was caused by APG and the design of the system is being handled by APG the responsibility of operating and maintaining any system should fall to APG. This should not preclude any involvement by Harford County, since the County's responsibility is to provide safe drinking water for its residents.

**Response No. 27:** The treatment plant is and will be tied in to the County's distribution system. The County holds the permit to operate the system and distribute the water. Legally APG could not operate the system and logistically it would be difficult for APG to operate one part of the system and the County operate another part of the system. There has been no change to the ROD.

### 3.4 SAMPLE NEWSPAPER NOTICE ANNOUNCING THE PUBLIC COMMENT PERIOD AND THE PUBLIC MEETING

A4

THE AEGIS

Wednesday, June 9, 1999

## U.S. ARMY INVITES PUBLIC COMMENT ON PROPOSED PLAN FOR WESTERN BOUNDARY STUDY AREA GROUNDWATER

Aberdeen Proving Ground (APG) invites the public to comment on its Proposed Plan for a portion of the groundwater at its Western Boundary Study Area, part of APG's Aberdeen Area.

### FACT SHEET

APG has prepared a fact sheet on the Proposed Plan which includes a comment form that can be returned to APG. If you are not on APG's mailing list, you can request a copy of the fact sheet by calling APG's 24-hour Environmental Information Line at (410) 272-8842 or (800) APG-9988.

### WRITTEN COMMENTS

The public may submit written comments on the Proposed Plan during the 45-day comment period that runs from June 9 to July 23, 1999. Comments must be postmarked by July 23 and may be sent to any of the following:

Mr. Ken Stachiw  
U.S. Army Garrison  
ATTN: STEAP-SH-ER  
5179 Hoadley Road  
APG, MD 21010

Mr. Steve Hirsh  
U.S. Environmental Protection  
Agency  
1650 Arch Street (3HS50)  
Philadelphia, PA 19103

Mr. John Fairbank  
Maryland Department of the  
Environment  
Waste Management Division  
2500 Broening Highway  
Baltimore, MD 21224

You can review the Proposed and provide comments through the APG Web Site at [www.apg.army.mil](http://www.apg.army.mil); click on "Environmental Cleanup," then click on "Documents" to review the plan and "Public Participation" and "e-mail response form" to submit comments.

### PUBLIC MEETING

APG invites the public to attend a meeting on:  
**DATE:** Tuesday, June 29, 1999  
**TIME:** 6:30 p.m. poster/information session  
7:15 p.m. presentation  
**PLACE:** Aberdeen Senior Center  
7 W. Franklin Street  
Aberdeen, MD 21001  
The meeting location is wheelchair accessible, and an interpreter for the hearing impaired is available with 72-hours advance notice (call 800-APG-9998).

### PROPOSED ACTION

APG is proposing remediation alternatives for a portion of the groundwater in its Aberdeen Area, near the Harford County well field. In 1992, environmental sampling detected low levels of trichloroethene (TCE), an industrial solvent, in some production wells. TCE was used in fire training exercises historically conducted at the site. As an interim solution, APG quickly constructed a plant to treat the groundwater from two production wells while studies continued. APG is now proposing a long-term solution to address the groundwater throughout this portion of the Western Boundary Study Area.

### ALTERNATIVES EVALUATED

APG, EPA and Maryland Department of the Environment evaluated the following alternatives:

**Alternative 1: No Action** - The law requires APG evaluate taking no action to establish a baseline for comparison with other alternatives. Under this alternative, the Army would dismantle the current treatment system and conduct ground water monitoring for 30 years.

Cost: \$904,173

**Alternative 2: Limited Action** - Operation of the current treatment plant would continue with no upgrades or modifications to treat groundwater from additional wells. APG would conduct groundwater monitoring for 30 years.

Cost: \$2,614,050

**Alternative 3: Relocate and Upgrade Existing Treatment Plant** - The existing treatment plant would be moved to Harford County's Perryman facility and upgraded to connect and treat all eight of the Harford County production wells. The upgraded plant will use granular activated carbon. APG also would continue to monitor the groundwater for 30 years.

Cost: \$4,260,520

**Alternative 4: Construct a New Plant with a Tower Air Stripper** - A new plant would be constructed to connect all eight of the Harford County production wells. The treatment process would use an air stripper instead of the granular activated carbon system to treat the TCE. The system would not be effective in removing other chemicals such as explosive compounds or metals.

Cost: \$5,896,216

**Based on their analysis, APG and EPA prefer Alternative 3, Relocate and Upgrade Existing Treatment Plant. The Maryland Department of the Environment will finalize its position after reviewing public comments.**

The preferred alternative may be modified or a new alternative may be developed based on public input. The final remedy selected will be documented in a Record of Decision that summarizes the decision-making process. APG will summarize and respond to all written comments received during the comment period as part of the Record of Decision. Copies of the Focused Feasibility Study and the Proposed Plan are available for review at the APG information repositories. The repositories are located at the Edgewood and Aberdeen branches of Harford County Library and Miller Library at Washington College in Kent County.

#### QUESTIONS

If you have any questions, please call APG's 24-hour Environmental Information Line at (410) 272-8842 or (800) APG -9998

ICF Kaiser Engineers, Inc. (ICF). December 1998. Human Health Risk Assessment of Operable Unit 1 Western Boundary Study Area (Draft Report). Aberdeen Proving Ground, MD.

General Physics, May 1999. Western Boundary Study Area, Focused Feasibility Study, Operable Unit 1, Aberdeen Proving Ground, Maryland, Aberdeen Area.

Roy F. Weston, May 1999. Proposed Plan for Remedial Action, Western Boundary Study Area, Operable Unit 1 — Groundwater, Aberdeen Proving Ground, Aberdeen Area, Maryland.

URS Greiner Woodward Clyde Federal Services. January 1999. " Remedial Investigation of the Western Boundary Study Area in the Aberdeen Area of Aberdeen Proving Ground Maryland (Draft Report). Gaithersburg, Maryland

# TABLES

**Table 1: Summary and Cumulative Risks Associated with Exposures to Western Boundary Study Area OU1 Groundwater under Future Land-Use Conditions**

(a) Location/Pathway	Cancer Risk	Predominant Chemicals (b)	Non- Cancer Hazard Index	Predominant Chemicals (b)
<b>Site Worker</b>				
<u>Site Wide</u>				
Ingestion	6E-06	1, 1 -dichloroethene, arsenic (e)	5E-01	--(d)
<u>TCE Plume</u>				
Ingestion	1 E-05	1,1-dichloroethene, trichloroethene, arsenic (e)	5E-01	--(d)
<u>Explosives Area</u>				
Ingestion	2E-06	trichloroethene	6E-01	--(d)
<b>Child Resident</b>				
<u>Site Wide</u>				
Ingestion	9E-06	1, 1 -dichloroethene, arsenic (e)	3E+00	antimony, thallium
Dermal	3E-07	--(c)	6E-02	--(d)
Absorption				
<b>Cumulative Risk</b>	9E-06		3E+00	
<u>TCE Plume</u>				
Ingestion	2E-05	11-dichloroethene, trichloroethene, arsenic (e)	3E+00	trichloroethene, carbon tetrachloride, chloroform, 1,2 - dichloroethene (total), 1,1 - dichloroethene, tetrachloroethene
Dermal	1 E-06	--(c)	2E-01	--(d)
Absorption				
<b>Cumulative Risk</b>	2E-06		3E+00	
<u>Explosives Area</u>				
Ingestion	3E-06	trichloroethene	4E+00	manganese
Dermal	3E-07	--(c)	1 E-01	--(d)
Absorption				
<b>Cumulative Risk</b>	3E-06		4E+00	
<b>Adult Resident</b>				
<u>Site Wide</u>				
Ingestion	2E-05	1, 1 -dichloroethene, trichloroethene, arsenic (e)	1 E+00	--(d)
Dermal	9E-07	-(c)	3E-02	--(d)
Absorption				
Inhalation	2E-06	-(c)	9E-02	--(d)
<b>Cumulative Risk</b>	2E-05		1E+00 (f)	
<u>TCE Plume</u>				
Ingestion	3E-05	carbon tetrachloride, 1, 1 -dichloroethene, trichloroethene, arsenic (e)	1 E+00	--(d)
Dermal	3E-06	trichloroethene	9E-02	--(d)
Absorption				
Inhalation	7E-06	1. 1 -dichloroethene, trichloroethene	1 E-01	--(d)
<b>Cumulative Risk</b>	4E-05		2E+00 (f)	
<u>Explosives Area</u>				
Ingestion	6E-06	carbon tetrachloride, trichloroethene	2E+00	manganese
Dermal	8E-07	--(c)	6E-02	--(d)
Absorption				
Inhalation	1 E-06	trichloroethene	2E-02	--(d)
<b>Cumulative Risk</b>	8E-06		2E+00	

(a) 1,2-dichloroethene (total) was not evaluated for the inhalation pathway due to a lack of toxicity criteria.

(b) For carcinogens, the predominant chemicals had a chemical-specific cancer risk greater than or equal to  $1 \times 10^{-6}$ . For non-carcinogens, the predominant chemicals had a target-organ HI greater than or equal to 1.

(c) No compounds contributed to or had a chemical-specific cancer risk greater than or equal to  $1 \times 10^{-6}$ .

(d) No compounds contributed to or had a HI greater than or equal to 1 for a specific target organ.

- (e) Arsenic was detected at concentrations determined to be within site-specific reference concentrations.
- (f) Although the potential cumulative HI was greater than 1, the combined-pathway target-organ-specific HI's were less than 1.

**Table 2: Chemical-Specific ARARs**

<b>FEDERAL</b>		
<b>Act</b>	<b>Status</b>	<b>Description</b>
Resource Conservation and Recovery Act (RCRA) (40 CFR 264.94; (42 USC 6905, 6912(a), and 6925)	Relevant and Appropriate	Groundwater protection standards - RCRA Maximum Concentration and Alternative Concentration Limits.
Safety Drinking Water Act (SDWA) (40 CRF 141.11-141.16, 141.50, 141.51, 141.61, 141.62); (42 USC 300f, 300g, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9)	Relevant and Appropriate	Protection of drinking water supplies and systems. Maximum contaminant levels (MCLs) and MCL goals
<b>MARYLAND</b>		
<b>COMAR*Subtitle</b>	<b>Status</b>	<b>Description</b>
Title 26, Subtitle 04 - Regulation of Water Supply, Sewage Disposal, and Solid Waste (26.04.07.19, .20; 26.04.01.03; 26.04.07.21; 26.04.07.22)	Relevant and Appropriate	Quality of Drinking Water in Maryland

\*COMAR = Code of Maryland Regulations.

USC = United States Code.

CFR = Code of Federal Regulations.

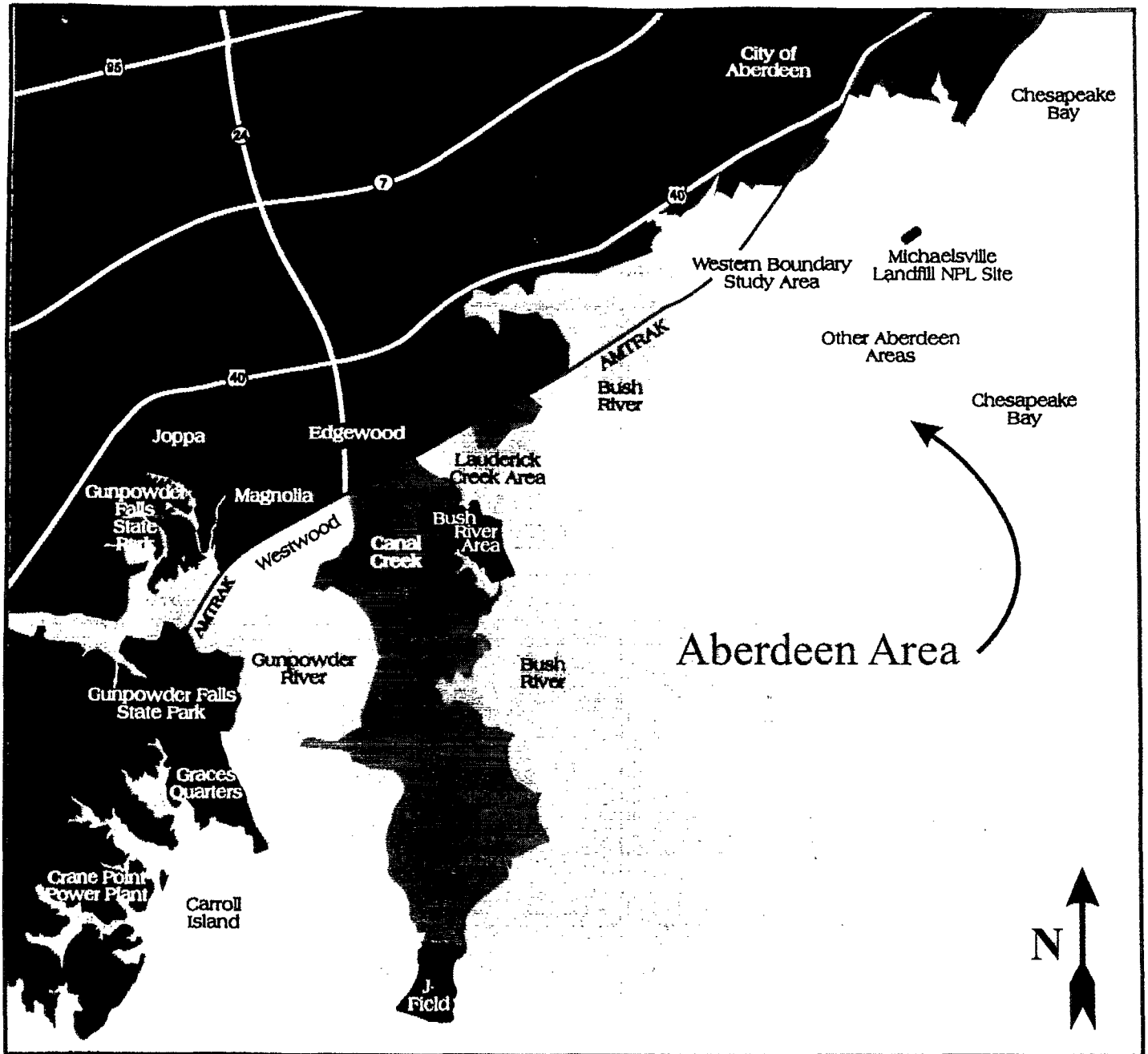
Source: Directorate of Safety, Health and Environment. July 1994. *Document Quality Assurance Guidance and Checklists, Installation Restoration Program, Aberdeen Proving Ground, MD.*



**Table 3: Action-Specific ARARs**

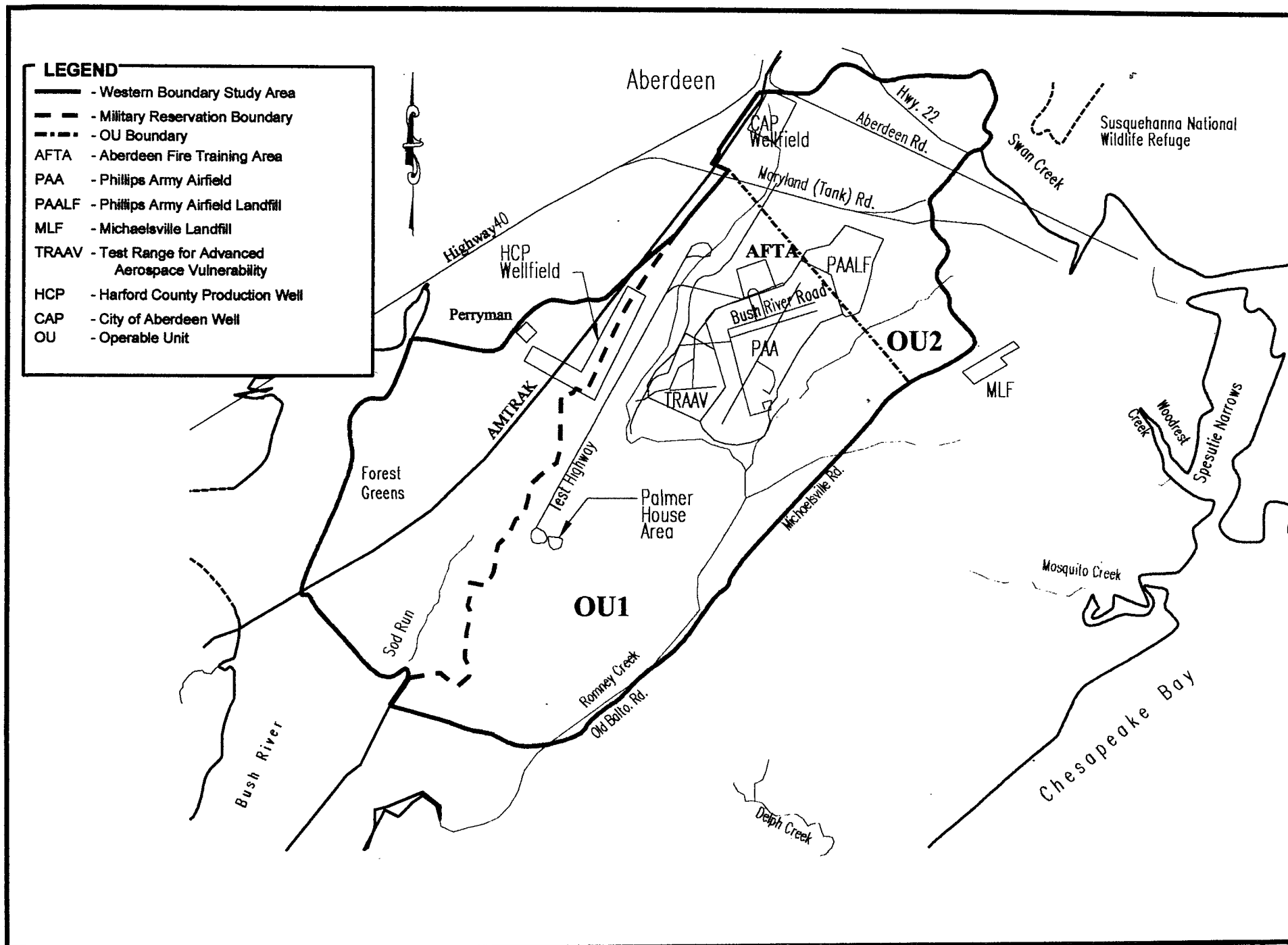
Act	Status	Description
<b>FEDERAL</b>		
EPA Groundwater Protection Strategy (EPA Policy Statement, August 1984)	To be Considered	Identifies groundwater quality to be achieved during remedial actions based on the aquifer characteristics and use.
RCRA - Preparedness and Prevention (40 CFR 264.30, .31); (42 USC 6905, 6912[a], 6924, and 6925)	Relevant and Appropriate	This regulation outlines requirements for safety equipment.
RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50 - .56); (42 USC 6905, 6912[a], 6924 and 6925)	Relevant and Appropriate	This regulation outlines the requirements for emergency procedures to be used following explosions, fires, etc.
Safe Drinking Water Act (40 CFR 141.); (42 USC 300f, 300g, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4; and 300j-9)	Relevant and Appropriate	Protection of drinking water supplies and systems.
<b>MARYLAND</b>		
Maryland Drinking Water regulations (COMAR 26.04.01)	Relevant and Appropriate	These regulations establish groundwater drinking water standards for the protection of human health.
Maryland Erosion and Sediment Control Regulations (COMAR 26.17.01)	Applicable	These regulations establish requirements for protecting surface water from sediment pollution during construction and operation of any waste treatment facility.
Maryland Annotated Code Title 12-Waterworks and Waste System Operations	Applicable	This code establishes requirements for wastewater and water treatment facilities.

# FIGURES

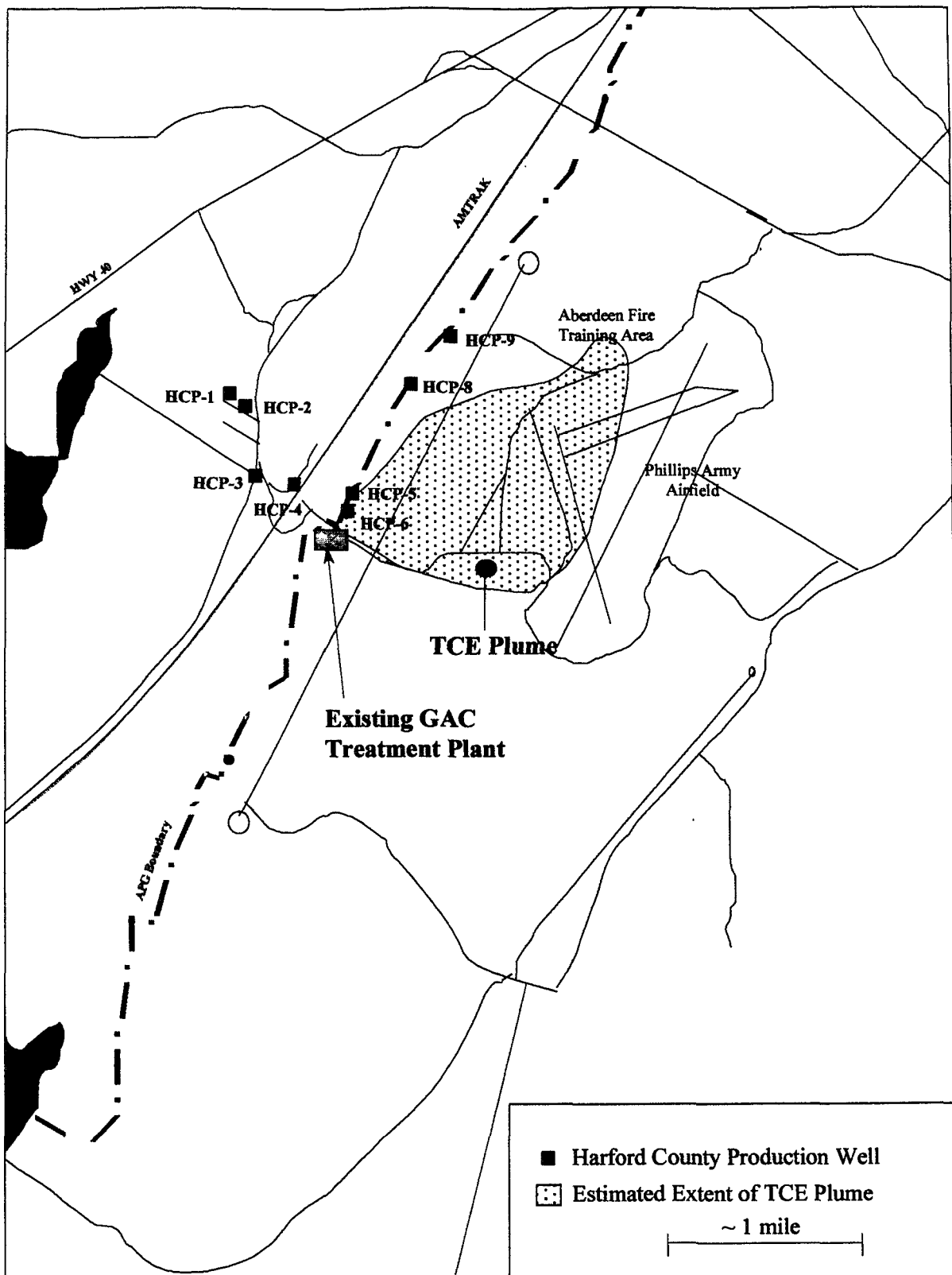


**Location of Aberdeen Proving Ground, Maryland**

Figure 1

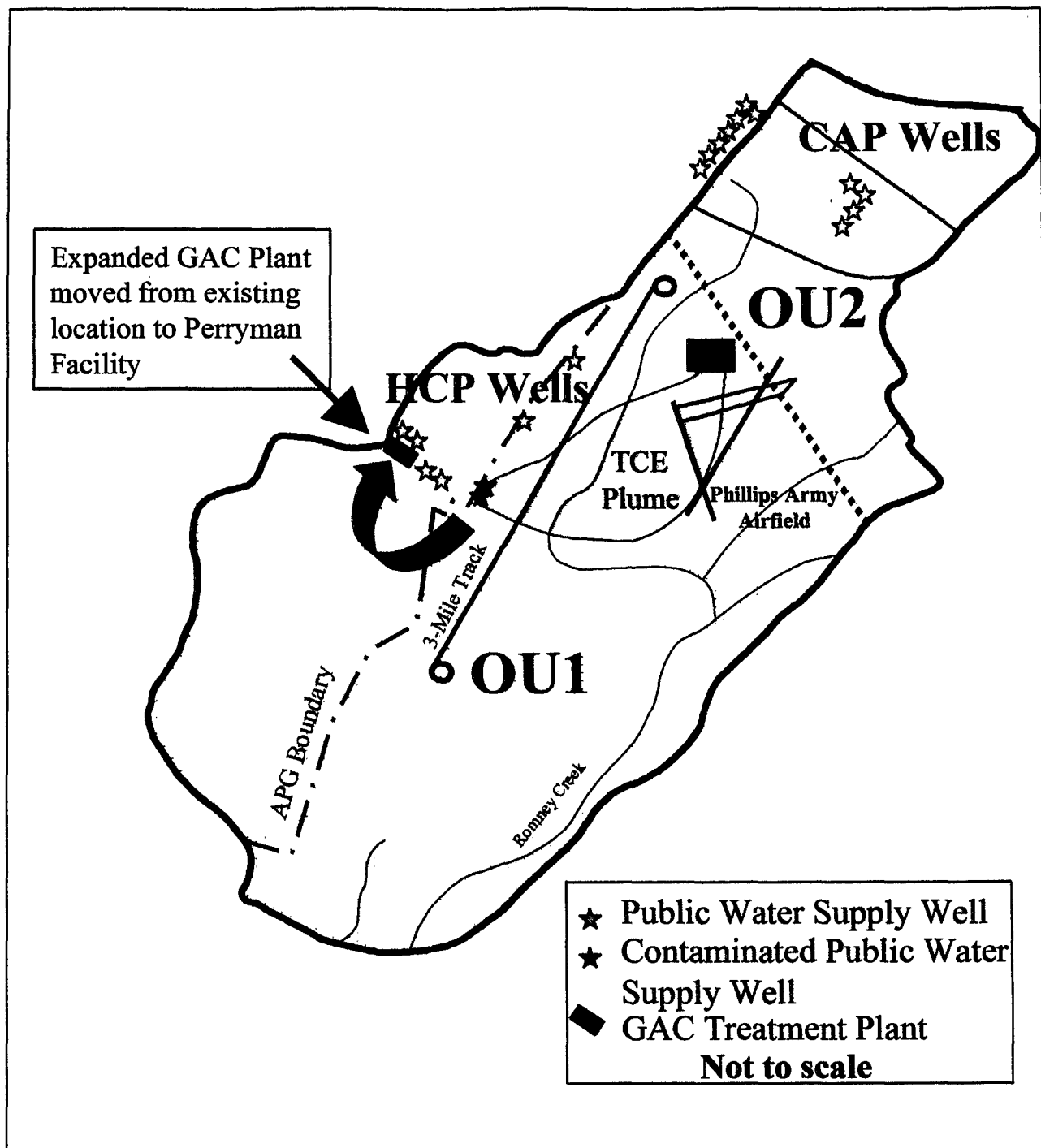


**FIGURE 2: LOCATION OF WBSA AND AREAS WITHIN THE WBSA AT APG**



**Schematic of Harford County Production Wells and TCE Plume**

**FIGURE 3**



Schematic of Relocated GAC Treatment Plant  
at the Harford County Perryman Facility

FIGURE 4